1 ~~47~~. (New) A spoolable composite tube extending along a longitudinal axis, the composite tube comprising:

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a substantially fluid impervious pressure barrier layer,

a composite layer formed of a first set of fibers embedded in a matrix, the composite layer and the pressure barrier layer together comprising at least a portion of a wall of the tubular member, at least 80%, by fiber volume, of the fibers of the first set of fibers being helically oriented relative to the longitudinal axis at an angle of between 30° and 70°, the matrix having a tensile modulus of elasticity of at least 100,000 psi to contribute to the ability of the tube to withstand tensile strains imposed on the tube when the tube is spooled on a reel,

an energy conductor extending lengthwise along the tubular member and embedded in the wall of the tubular member, and

a sensor mounted with the wall of the tubular member and connected for signal communication by way of the energy conductor, the sensor being capable of responding to an ambient condition of the tubular member.

2 ~~48~~. (New) A composite tubular member according to claim ~~47~~ 1, wherein the sensor is integrally formed with the energy conductor.

3 ~~49~~. (New) A composite tubular member according to claim ~~47~~ 1, wherein the sensor is disposed within the wall.

4 ~~50~~. (New) A composite tubular member according to claim ~~47~~ 1, wherein the sensor is selected from the group consisting of acoustic sensors, optical sensors, mechanical sensors, electrical sensors, fluidic sensors, pressure sensors, temperature sensors, and chemical sensors.

5 ~~51~~. (New) A composite tubular member according to claim ~~50~~ 4, wherein the optical sensor is an interferometric sensor.

~~52~~ 6. (New) A composite tubular member according to claim ~~50~~ 4, wherein the optical sensor is an optical intensity sensor.

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~~53~~ 7. (New) A composite tubular member according to claim ~~52~~ 6, wherein the optical intensity sensor is selected from the group consisting of light scattering sensors, spectral transmission sensors, radiative loss sensors, reflectance sensors, and modal change sensors.

~~54~~ 8. (New) A composite tubular member according to claim ~~50~~ 4, wherein the mechanical sensor is selected from the group consisting of piezoelectric sensors, vibration sensors, position sensors, velocity sensors, strain sensors, and acceleration sensors.

~~55~~ 9. (New) A composite tubular member according to claim ~~50~~ 4, wherein the electrical sensor is selected from the group consisting of current sensors, voltages sensors, resistivity sensors, electric field sensors, and magnetic field sensors.

~~56~~ 10. (New) A composite tubular member according to claim ~~50~~ 4, wherein the fluidic sensor is selected from the group consisting of flow rate sensors, fluidic intensity sensors, and fluidic density sensors.

~~57~~ 11. (New) A composite tubular member according to claim ~~50~~ 4, wherein the pressure sensor is selected from the group consisting of absolute pressure sensors and differential pressure sensors.

~~58~~ 12. (New) A composite tubular member according to claim ~~50~~ 4, wherein the temperature sensor is selected from the group consisting of thermocouples, resistance thermometers, and optical pyrometers.

~~59~~ 13. (New) A composite tubular member according to claim ~~47~~ 1 wherein the sensor is embedded in the composite layer.

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~~60~~ 14. (New) A composite tubular member according to claim ~~47~~ 1 wherein the sensor is embedded in the pressure barrier layer.

~~61~~ 15. (New) A composite tubular member according to claim ~~47~~ 1 wherein the sensor is positioned between the pressure barrier layer and the composite layer.

~~62~~ 16. (New) A composite tubular member according to claim ~~47~~ 1 wherein the sensor is mounted to the inner surface of the composite tubular member.

~~63~~ 17. (New) A composite tubular member according to claim ~~47~~ 1 wherein the sensor is mounted to the exterior surface of the composite tubular member.

~~64~~ 18. (New) A composite tubular member according to claim ~~47~~ 1, further comprising at least one additional sensor arranged for signal communication by way of the energy conductor, the sensor and the additional sensor forming a set of sensors distributed along the length of the energy conductor.

~~65~~ 19. (New) A composite tubular member according to claim ~~64~~ 18, wherein the sensor and the additional sensor are positioned at different locations in the wall of the composite tubular member.

~~66~~ 20. (New) A composite tubular member according to claim ~~65~~ 19, further comprising means for forming a second energy conductor embedded in the wall of the tubular member, the sensor and the additional sensor being connected in parallel between the energy conductor and the second energy conductor means.

~~67~~ 21. (New) A composite tubular member according to claim ~~47~~ 1, further comprising a second energy conductor embedded in the wall of the tubular member and at least one additional sensor mounted with the wall of the tubular member and arranged for signal communication by way of the second energy conductor.

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~~68~~. (New) A composite tubular member according to claim ~~47~~, wherein the energy conductor extends helically along the length of the composite tubular member.

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~~69~~. (New) A composite tubular member according to claim ~~47~~, further comprising an axially extending second energy conductor embedded in the wall and disposed diametrically opposite from the energy conductor.

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~~70~~. (New) A composite tubular member according to claim ~~47~~, wherein the second energy conductor is selected from the group consisting of a hydraulic medium, a pneumatic medium, an electrical medium, and an optical medium.

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~~71~~. (New) A composite tubular member according to claim ~~70~~ 24, wherein the optical medium is an optical fiber selected from the group consisting of single-mode fibers, multimode fibers, or plastic fibers.

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~~72~~. (New) A composite tube according to claim ~~47~~, wherein the tensile modulus of elasticity of the matrix is at least 250,000 psi.

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~~73~~. (New) A composite tube according to claim ~~47~~, wherein the matrix has a maximum tensile elongation of greater than or equal to 5%.

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~~74~~. (New) A composite tube according to claim ~~47~~, wherein the matrix has a glass transition temperature of at least 180°F.

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~~75~~. (New) A composite tube according to claim ~~47~~, wherein the matrix has a tensile modulus of elasticity of at least 250,000 psi, has a maximum tensile elongation of greater than or equal to 5%, and has a glass transition temperature of at least 180°F.

30 ~~76~~. (New) A composite tube according to claim ~~47~~ 1, wherein the matrix is a thermoplastic having a tensile modulus of elasticity of at least 250,000 psi, having a maximum tensile elongation of greater than or equal to 5%, and having a melt temperature of at least 250°F.

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31 ~~77~~. (New) A composite tube according to claim ~~47~~ 1, wherein the matrix is a thermoplastic or thermoset polymer.

32 ~~78~~. (New) A composite tube according to claim ~~77~~ 31, wherein the thermoplastic polymer is selected from the group consisting of: polyetherketone (PEK), polyetheretherketone (PEEK), polyetherketoneketone (PEKK), polyesters, polyamides, polyethylenes, polyurethanes, polypropylenes, and polyphenylen sulfide.

33 ~~79~~. (New) A composite tube according to claim ~~78~~ 32, wherein the thermoset polymer is selected from the group consisting of: epoxy, phenolics, esters, vinyl esters, and polyesters.

34 ~~80~~. (New) A composite tube according to claim ~~47~~ 1, wherein the matrix is an epoxy having a tensile modulus of elasticity of at least 250,000 psi, a maximum tensile elongation of greater than or equal to 5%, and a glass transition temperature of at least 180°F.

35 ~~81~~ (New) A composite tube according to claim ~~47~~ 1, wherein the pressure barrier layer is a thermoplastic polymer having a mechanical elongation of at least 25% and a melt temperature of at least 250°F.

36 ~~82~~. (New) A composite tube according to claim ~~47~~ 1, wherein the pressure barrier layer is a composite of at least two thermoplastic polymers having a mechanical elongation of at least 25% and a melt temperature of at least 250°F.

37 ~~83~~. (New) A composite tube according to claim ~~47~~ 1, wherein the pressure barrier layer is a composite of thermoplastic polymer and a metallic material.

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~~84~~. (New) A composite tube according to claim ~~47~~, wherein the pressure barrier layer is a metallic material.

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~~85~~. (New) A composite tube according to claim ~~47~~, wherein an exterior surface of the pressure barrier layer includes grooves or channels to facilitate bonding of the pressure barrier layer to the composite layer.

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~~86~~. (New) A spoolable composite tube extending along a longitudinal axis, the composite tube comprising:

a first substantially fluid impervious pressure barrier layer,

a composite layer disposed external to and enclosing the first pressure barrier layer, the composite layer being formed of a first set of fibers embedded in the matrix, at least 80%, by fiber volume, of the fibers of the first set of fibers being helically oriented relative to the longitudinal axis at an angle of between 30° and 70°, the matrix having a tensile modulus of elasticity of at least 100,000 psi to contribute to the ability of the tube to withstand tensile strains imposed on the tube when the tube is spooled on a reel,

a second substantially fluid impervious pressure barrier layer disposed external to and enclosing the composite layer,

the composite layer, the first pressure barrier layer, and the second pressure barrier layer together comprising at least a portion of a wall of the tubular member,

an energy conductor extending lengthwise along the tubular member and embedded in the wall of the tubular member, and

a sensor mounted with the wall of the tubular member and connected for signal communication by way of the energy conductor, the sensor being capable of responding to an ambient condition of the tubular member.

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~~87~~. (New) A composite tube according to claim ~~86~~, wherein the second pressure barrier layer is formed from at least one of a metal, a thermoplastic, a thermoset film, and an elastomer.

~~88~~ 42. (New) A composite tube according to claim ~~86~~ 40, wherein the second pressure barrier layer is formed from a metal/polymer composite.

~~89~~ 43. (New) A composite tube according to claim ~~88~~ 42, wherein the metal/polymer composite is a metal-polymer foil.

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~~90~~ 44. (New) A composite tube according to claim ~~86~~ 40, wherein the second pressure barrier layer includes a fused particle coating of polymeric material.

~~91~~ 45. (New) A composite tube according to claim ~~86~~ 40, wherein the second pressure barrier layer has a minimum tensile elongation of at least 10% and an axial modulus of elasticity of less than 750,000 psi.

~~92~~ 46. (New) A composite tube according to claim ~~86~~ 40, wherein the second pressure barrier layer has a permeability of less than 0.4 x 10 to the -10 ccs per sec-cm²-cm-cmhg.

~~93~~ 47. (New) A composite tube according to claim ~~86~~ 40, wherein the second pressure barrier layer is constructed to substantially to prevent the diffusion of fluids through the second pressure barrier layer.

~~94~~ 48. (New) A composite tubular member for spooling in an open bore configuration onto a reel and for unspooling for deployment, said composite tubular member comprising

a substantially fluid impervious pressure barrier layer,

a composite layer formed of fibers and a matrix, said composite layer and said pressure barrier layer together comprising at lest a portion of a wall of said tubular member,

an energy conductor extending lengthwise along said tubular member and embedded in the wall of said tubular member,

a first sensor mounted with the wall of said tubular member and connected for signal communication by way of said energy conductor, said first sensor responding

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to a first ambient condition of said tubular member and communicating on said energy conductor a signal responsive thereto, and

a second sensor mounted with the wall of said tubular member and connected for signal communication by way of said energy conductor, said second sensor responding to a second ambient condition of said tubular member distinct from said first ambient condition and communicating on said energy conductor a signal responsive thereto.

49 ~~95~~. (New) A composite tubular member according to claim 48 ~~94~~, wherein said first sensor is an acoustic sensor, an optical sensor, a mechanical sensor, an electrical sensor, a fluidic sensor, a pressure sensor, a temperature sensor, or a chemical sensor.

50 ~~96~~. (New) A composite tubular member according to claim 49 ~~95~~, wherein said second sensor is an acoustic sensor, an optical sensor, a mechanical sensor, an electrical sensor, a fluidic sensor, a pressure sensor, a temperature sensor, or a chemical sensor.

51 ~~97~~. (New) A composite tubular member according to claim 48 ~~94~~, further comprising a third sensor embedded within the wall of said tubular member and connected for signal communication by way of said energy conductor, said third sensor responding to a third ambient condition of said tubular member distinct from said first ambient condition and said second ambient condition and communicating on said energy conductor a signal responsive thereto.